WARMFLO COMPATIBLE

Downflow/Horizontal

EM-WD *** 5*

Width
5 = 15”
8 = 18”

Number of Stages

kW Size
10 = 10 kW
15 = 15 kW
20 = 20 kW
14 = 14.4 kW 3 Ph
22 = 22 kW 3 Ph
25 = 25 kW

This manual provides the installation information for the mechanical and 240 power wiring of the Electro-Mate® itself.

The WarmFlo control wiring is detailed within controller manual, HI320, typically shipped with the furnace interface module.

Note: This model now includes 250°F manual hi-limit reset, located behind the hinged controller board door.

Drawings: **EC001**
EA104
EA111
ES723
ES724
ES725

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CFM Calculation (oil/gas furnace)	4
Drawings	EC001 EA104 EA111 ES723 ES724 ES725 UAI012

DESCRIPTION

This Electro-Mate series is the supplementary electric element for air source heat pump, add-on or A-coil type. The placement of the electric elements and mechanical design of this Electro-Mate is compatible with zero clearance at the heat pump and/or A/C A-coil top.

These models are approved and listed for **downflow** and horizontal applications. At no time can this model be installed in an upflow application. Electro Industries has a similar unit specially designed for upflow applications. The Electro-Mate must be installed on the "warm side" of the HP A-coil.

Caution, Heat Pump Application: Depending upon mechanical positioning and airflow, in all cases (heat pump) the electric element, Electro-Mate, unit must be on the supply or warm side of the HP refrigerant coil.

Generally, a base adapter or raised plenum is required for installation of this DOWNFLOW Electro-Mate. The instructions on page 2 for the field design and fabrication of this base adapter must be followed in detail.

The controller installation manual, HI320, has additional comments on horizontal installation.

This Electro-Mate unit contains several patented mechanical airflow, and electrical control features. Since these patented features cause this unit to be unique compared to other electric heating products, this installation manual must be studied and followed in detail.

Attached is the product limited warranty statement. Please read and understand conditions associated with proper installation, unauthorized changes, and POWER ON procedures.

For information, this unit is rated at 240VAC. When operating at lower source voltage, the output is reduced.

Example: 10 kW rating
220VAC source - 8.8 kW
208VAC source - 7.5 kW

INSTALLATION REQUIREMENTS

1. All installation work must be performed by trained, qualified contractors or technicians. Electro Industries, Inc., sponsors installation and service schools to assist the installer. **Visit our web site at electromn.com for upcoming service schools.**
2. All electrical wiring must be in accordance with National Electric Code and local electric codes, ordinances, and regulations.
3. Observe electric polarity and wiring colors. Failure to observe could cause electric shock and/or damage to the equipment.
4. This unit can only be used for its intended design as described in this manual. Any internal wiring changes, modifications to the circuit board, modifications or bypass of any controls, or installation practices not according to the details of this manual will void the product warranty, the ARL certification label, and manufacturer product liability. Electro Industries, Inc., cannot be held responsible for field modifications, incorrect installations, and conditions which may bypass or compromise the built-in safety features and controls.
5. The only approved installation for this Electro-Mate series is downflow and horizontal furnace and above or downstream from the air conditioning or heat pump A-coil. Any other configuration or furnace plenum/ducting installation voids warranty and manufacturers product liability.

SPECIFICATIONS - TABLE 1

Model Number	EM-WD1025*	EM-WD153**	EM-WD2045*	EM-WD25458	EM-WD14358	EM-WD22478
kW rating	10	15	20	25	14.4	22
BTUH	34000	51000	68000	85000	49000	75000
Voltage/Phase	240/1	240/1	240/1	240/1	208/3	208/3
Circuit Breaker	60	1-30, 1-60	2-60	1-30, 2-60	50	80
Source Feed	1	2	2	3	1	1
Elements	4	6	8	10	6	9
Min. CFM	700	1100	1400	1700	1000	1500
Max. Temp. Rise	45°F	45°F	45°F	45°F	45°F	45°F
Shipping Weight	24#	30#	32#	34#	32#	36#

MECHANICAL INSTALLATION

Caution, Heat Pump Application: Depending upon mechanical positioning and airflow, in all cases (heat pump) the electric element, Electro-Mate, unit must be on the supply or **warm** side of the HP refrigerant coil.

Depending upon application, refer to the appropriate drawing and Electro-Mate position.

- EA104, revision E and above – heat pump – below A-coil.
- EA111 – air conditioning, non-heat pump – above A-coil.

ADDITIONAL HEAT PUMP COMMENTS: Since this is probably associated with a heat pump, these instructions and drawing EA104 assume a A-coil where the air is driven backwards through the A-coil. If your installation is a slant coil or a V-coil, positioning of the Electro-Mate is still the same, in the case of the V-coil you can have a much tighter installation.

The 1" minimum spacing of the actual Electro-Mate front enclosure and the bottom of the drip pan is a compromise because typically vertical space is at a premium. If you can allow additional space under the drip pan, do so.

For this type of installation where the air is coming out of the center hole in the drip pan, actually the use of a **15" wide** Electro-Mate is **preferred**. This would be opposite the normal recommendation for a 15" wide unit in large plenums. However, there still should be side and end baffling even though the air is coming out of the drip pan center. In this situation there will definitely be turbulence and unpredictable flow as it comes out of the center hole. Make sure all the air is forced through the Electro-Mate elements.

FURNACE TYPE - This unit must be installed in as DOWNFLOW application only. Do not turn the Electro-Mate upside down or install this unit in the cold air return.

Verify that all transitions have angles less then 3Ø°, the Electro-Mate is centered within the plenum, and there are no odd shaped angles or odd shaped transitions within the plenum.

If the width or depth is greater than approximately 1" of the Electro-Mate element pattern, side and back deflectors may be required. Use the same general deflector requirements and techniques normally described in the Electro-Mate upflow manual. If you are not familiar with this, request drawing EH1Ø8.

For horizontal applications reference manual HI320.

If the DOWNFLOW furnace is setting directly on the floor, the furnace will have to be raised for insertion of the Electro-Mate unit. This will require a field designed and constructed plenum. This plenum must have sufficient strength to carry the weight of the existing furnace.

The Electro-Mate is designed with a special double plate at the element mounting. Cool air from the blower must blow between these two plates. Therefore, the Elector-Mate must be inserted into the base plenum such that the mounting plate is even with the edge of the hot air outlet hole. Do not necessarily line up the Electro-Mate control box with the furnace cabinet front. The concern is the hole in the bottom of the furnace mating with Electro-Mate elements.

Cutting the correct hole size in the plenum – locate the supplied cutout template marked "UAI012". Once placement of the Electro-Mate is determined, tape all four corners of the template to the plenum. **Make sure that the template is squared off to the plenum before proceeding to the next step.** Using a utility knife cut out the appropriate dashed line on the template. Then use a marker to trace around the area cut out of the template. Remove the template from the plenum and proceed to cut the hole into the plenum.

Extend the "V" channel to butt against the plenum surface opposite the 8"x18" hole. After Electro-Mate insertion, a sheet metal screw may be installed to attach the back plate of this "V" deflector channel.

Insert the Electro-Mate and properly screw to base plenum. If the base plenum is 18" wide, side supports will be needed on the side for proper attachment to the Electro-Mate.

Special Hi-Limit Probe Installation

Shipped loose with this unit is a hi-limit probe which must be installed under the electric elements (counterflow). This is shown on drawing EA104. This hi-limit probe must receive direct heated air from the electric elements. It is wired into the red/white hi-limit loop as detailed in the "ELECTRICAL HOOK-UP" section of this manual.

WarmFlo Supply Sensor Installation

Notice spacing and positioning comments on drawing EA104. Basically this sensor needs to be in a major air stream, about 20 airflow inches away from the actual electric element.

ELECTRICAL INSTALLATION

This manual applies only to the 240 power wiring. See WarmFlo controller manual, HI320, for all control wiring.

The Electro-Mate nameplate lists the continuous amp draw for the model you are installing. Based upon NEC requirements and/or local codes, supply and route an appropriate 240VAC size cable or power wires between the electrical panel source and the Electro-Mate inside circuit breakers, use only **copper** connected to breakers. If you would like to feed the Electro-Mate breakers using one feed you must order the optional bus bars listed below:

15 and 20 kW models	EM-5716
25 kW models	EM-5717

Grounding – route and install the appropriate size conductor wire between the Electro-Mate lug labeled "ground" and the building service entrance panel ground bus. This must be a conductor wire sized according to the total amp rating of the Electro-Mate. The conduit is not a sufficient ground conductor.

MANUAL RESET

Located behind the hinged control board door is a 250°F manual reset. This breaks the circuit for all electric elements. However, connected in the same circuit loop is the automatic reset 170°F hi-limit. Normally the automatic reset should always take care of any overheat condition prior to popping the manual reset. Therefore, you should not experience a manual reset condition unless there has been a true hardware failure.

Two exceptions – a standby furnace (or wood furnace) having an outlet temperature greater than 250°F or cold startup without blower. Because of the sensitivity of this capillary manual reset, anytime there is a blower failure when the elements come on you can expect a manual reset.

SYSTEM AIRFLOW

Since the majority of the applications for this Electro-Mate are air source heat pumps, it is assumed the airflow is adequate for the heat pump and typically greater than required by this Electro-Mate. In any case, the very minimum airflow for this Electro-Mate is:

10 kW – 700 CFM
15 kW – 1100 CFM
20 kW – 1400 CFM
25 kW – 1700 CFM

These requirements assume 85° air inlet (heat pump output). If using with A/C only, use standard Electro-Mate CFM requirements.

Also follow the power up instructions in the warranty report procedure EC110.

1. SYSTEM TEMPERATURE RISE - The overall temperature rise (both sides of Electro-Mate) must be less than 45°F. If any portion of the plenum top is operating with an air temperature greater than 125°F, element life will be shortened.

   A. CFM CALCULATION, THIS ELECTRO-MATE - By measuring the temperature rise across the Electro-Mate, the actual CFM can be quite accurately determined. The airflow and Electro-Mate unit must be operating in a stable condition for at least 10 minutes. If it is cycling on temperature limit, this calculation will be of no value. The accuracy of this formula will depend upon uniform and average temperature rise plenum thermometer readings and the accuracy of both the clamp-on amp meter and AC voltmeter. NOTE: The volts x amps x 3.4 value is the same as Btuh output.

$$CFM = \frac{\text{Volts x Amps x 3.4}}{\text{Temperature Rise x 1.08}}$$

   B. CALCULATED CFM, OIL/GAS FURNACE - By measuring the temperature rise across the existing furnace, the CFM can be approximated. The accuracy of this formula will depend upon the estimated or determined Btuh output (actual heat energy across the furnace). You cannot use name plate Btuh values. You must use a realistic estimated or measured true OUTPUT Btuh.

$$CFM = \frac{\text{Btuh (output)}}{\text{Temperature Rise x 1.08}}$$

DUCT SIZING TABLE

DUCT CAP. CFM	DUCT DIAM IN.	Equivalent Friction Rectangular Ducts (In.)								
1	2	3	4	5	6	7	8	9	10	11
80	5.3	5x5	6x4	9x3						
100	5.8	6x5	7x4	10x3						
125	6.3	6x6	7x5	9x4	12x3					
150	6.8	7x6	8x5	10x4	15x3					
175	7.2	7x6	9x5	11x4	17x3					
200	7.5	7x7	8x6	10x5	13x4	19x3				
225	7.9	8x7	9x6	11x5	14x4	21x3				
250	8.2	8x7	10x6	12x5	16x4	23x3				
275	8.5	8x8	9x7	10x6	13x6	17x4	25x3			
300	8.8	8x8	9x7	11x6	14x5	18x4	27x3			
350	9.3	9x8	11x7	13x6	16x5	21x4	32x3			
400	9.8	9x9	10x8	12x7	14x6	18x5	24x4	36x3		
450	10.2	10x9	11x8	13x7	15x6	19x5	26x4	40x3		
500	10.7	10x10	11x9	12x8	14x7	17x6	21x5	28x4	44x3	
550	11.0	10x10	11x9	13x8	15x7	18x6	23x5	32x4	48x3	
600	11.4	11x10	12x9	14x8	16x7	20x6	25x5	35x4	52x3	
650	11.8	11x11	12x10	13x9	15x8	17x7	21x6	27x5	37x4	
700	12.1	11x11	12x10	14x9	16x8	18x7	22x6	29x5	40x4	
750	12.3	12x11	13x10	15x9	17x8	20x7	24x6	30x5	42x4	
800	12.7	12x11	14x10	15x9	18x8	21x7	25x6	32x5	45x4	
850	13.0	12x12	13x11	14x10	16x9	18x8	21x7	26x6	35x5	
900	13.2	12x12	14x11	15x10	17x9	19x8	23x7	28x6	36x5	
950	13.6	13x12	14x11	16x10	18x9	20x8	24x7	30x6	38x5	
1000	13.9	13x12	15x11	16x10	18x9	21x8	25x7	31x6	40x5	
1100	14.3	13x13	14x12	16x11	18x10	20x9	23x8	27x7	33x6	43x5
1200	14.8	14x13	15x12	17x11	19x10	21x9	25x8	29x7	36x6	47x5
1300	15.2	14x14	15x13	16x12	18x11	20x10	23x9	26x8	31x7	39x6
1400	15.7	15x14	16x13	17x12	19x11	21x10	24x9	28x8	34x7	41x6

NOTE:

If sizing is in question, always go to the larger duct for CFM in question.

Grilles and registers shall be sized according to manufacturers performance data capable of handling the CFM of the duct at a throw based on room dimensions. Return air registers should be selected to provide for 450 FPM face velocity.

The above capacities assume individual duct static pressures of less than about 0.1. If the static pressure is higher, assume considerably reduced CFM.

EVALUATING AND SIZING DUCT WORK SYSTEMS

Quickie Method

- The trunkline duct work off of the plenum should have 70 square inches per ton for the supply side
- The return air plenum should have 80 square inches per ton

Standards Used

- Heat pumps require 400 CFM to 450 CFM per ton to operate
- Use a friction per 100 ft. of duct of .08 when sizing or evaluating supply duct work
- Use a friction per 100 ft. of duct of .06 when sizing or evaluating return air duct work
- Duct work is manufactured in 8 ft. lengths
- Rectangular duct work is normally 8 inches tall
- Return air grills are normally 8 inches high and the width of one or two joist spaces
- 7 inch round pipe will handle approximately 150 CFM
- 6 inch round pipe will handle approximately 100 CFM

Tips

- Never go larger than a 3 to 1 ratio on rectangular duct work width to height when figuring a duct work system
- Common branch duct round pipe is either 6 inch or 7 inch
- Never use branch duct piping smaller than 6 inch round pipe when using a heat pump system
- Normal practice when sizing new duct work is to use a friction per 100 ft. of duct of .08 for the supply line duct work and .06 for the return line duct work
- When doing a retrofit job you will more likely have problems with the distribution of air to the rooms than the size of the duct work

Evaluating Existing Duct Work

1. Perform a heat loss/gain calculation on the structure and obtain the size system needed and the CFM needed per room.

2. Figure the total CFM needed for the system room by room or: 400 CFM minimum to 450 CFM maximum x heat pump system tonnage.

3. Figure the CFM that can be supplied with each trunkline leaving the plenum using the duct calculator with a friction per 100 ft. of duct of .08.

4. The total CFM that the trunkline(s) can handle must equal or exceed the CFM required by the heat pump system. If it is not, the duct work will have to be replaced or changed.

5. If the trunkline is large enough, subtract the heat loss/gain CFM (whichever is larger) needed per room, fed by the first section of trunkline from the total provided. Then figure the size of the next piece of trunkline for the remaining CFM.

6. The return air duct work must handle the CFM put out by the supply side of the system. Using the duct calculator, figure the amount of air that can be handled by the existing system. Use a friction per 100 ft. of duct of .06. Figure the trunklines first, then branch ducts.

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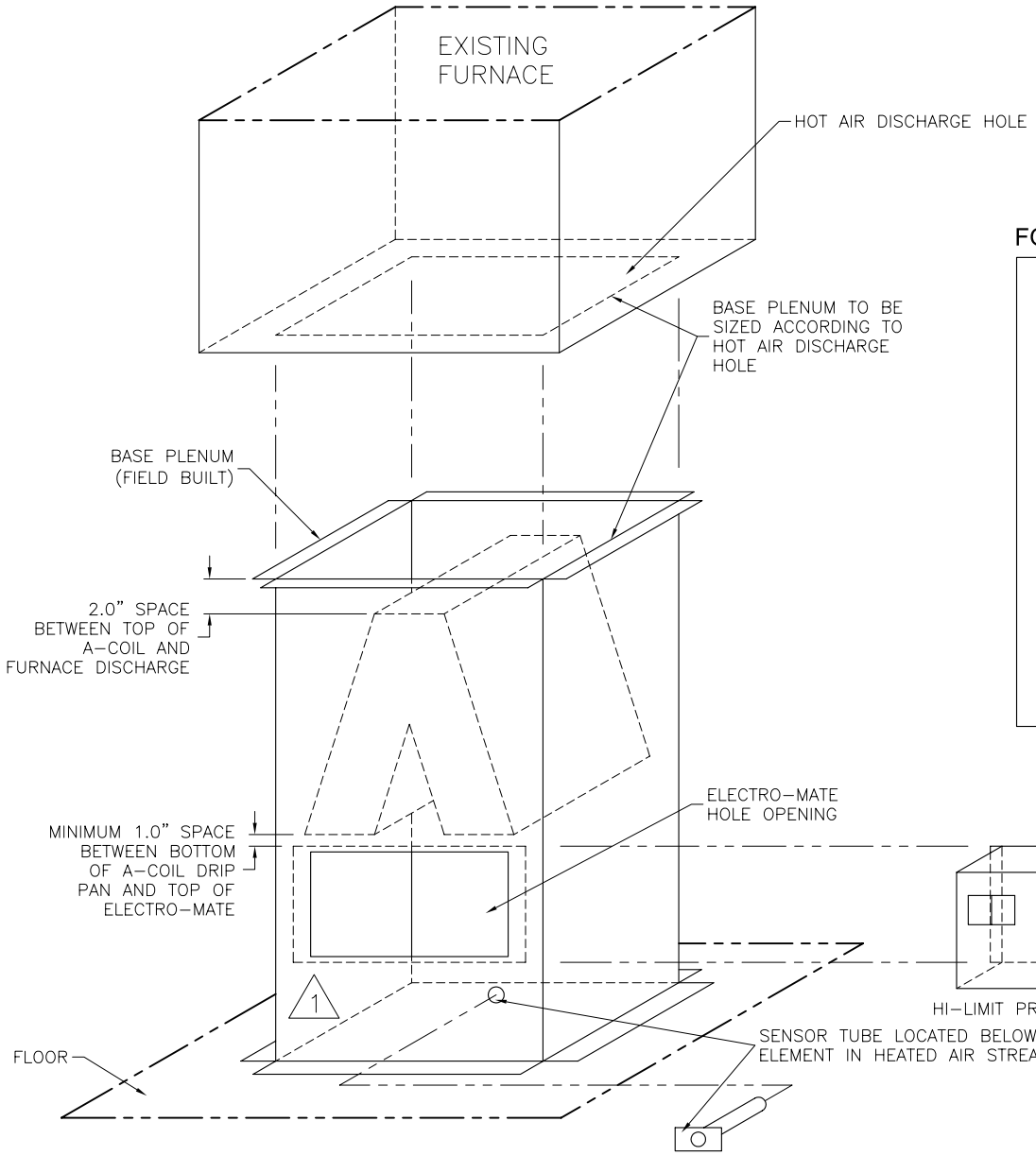
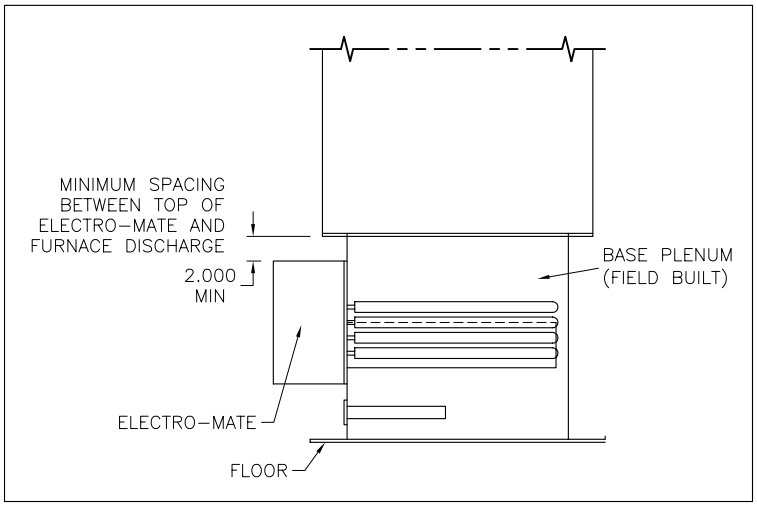
ELECTRO-MATE DOWNFLOW INSTALLATION (HEAT PUMP)


EXISTING FURNACE
HOT AIR DISCHARGE HOLE
BASE PLENUM TO BE SIZED ACCORDING TO HOT AIR DISCHARGE HOLE
BASE PLENUM (FIELD BUILT)
2.0" SPACE BETWEEN TOP OF A-COIL AND FURNACE DISCHARGE
MINIMUM 1.0" SPACE BETWEEN BOTTOM OF A-COIL DRIP PAN AND TOP OF ELECTRO-MATE
ELECTRO-MATE HOLE OPENING
1
FLOOR
SENSOR TUBE LOCATED BELOW ELEMENT IN HEATED AIR STREAM
HI-LIMIT PROBE
MOUNT HIGH-LIMIT AS CLOSE AS POSSIBLE TO ELECTRO-MATE

FOR NON-A/C OR HEAT PUMP APPLICATIONS



NOTES:

1. WARMFLO REQUIRES SUPPLY SENSOR (ST) INSTALLATION. 18 TO 24 AIRFLOW INCHES FROM THE ELECTRO-MATE ELEMENT, SEE MANUAL TEXT FOR SUGGESTIONS.

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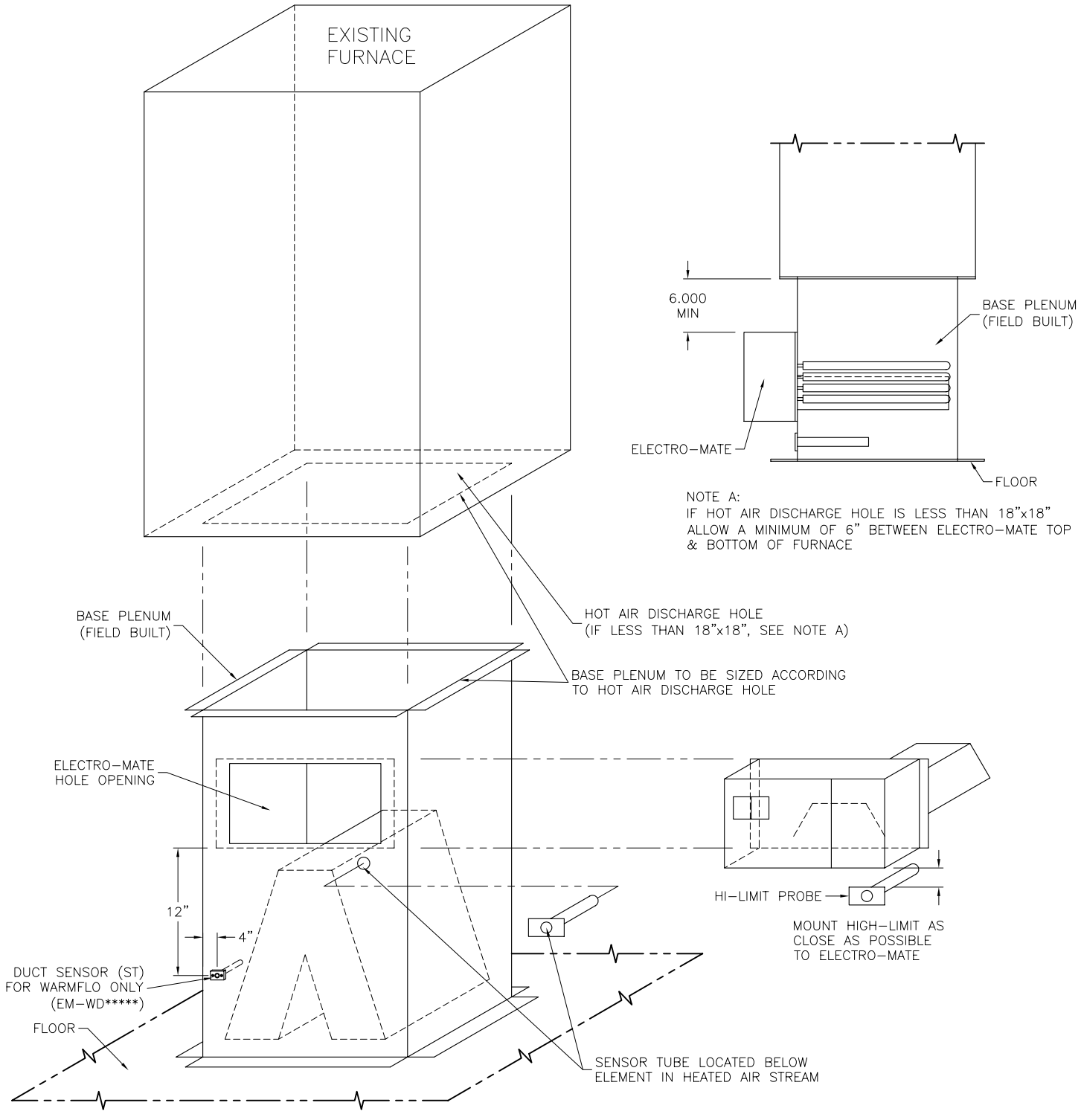
ELECTRO INDUSTRIES, INC.
MONTICELLO, MN 55362

ELECTRO-MATE DOWNFLOW INSTALLATION (NON - HEAT PUMP)


EXISTING FURNACE
6.000 MIN
BASE PLENUM (FIELD BUILT)
ELECTRO–MATE
FLOOR
NOTE A:
IF HOT AIR DISCHARGE HOLE IS LESS THAN 18"x18" ALLOW A MINIMUM OF 6" BETWEEN ELECTRO–MATE TOP & BOTTOM OF FURNACE
BASE PLENUM (FIELD BUILT)
HOT AIR DISCHARGE HOLE (IF LESS THAN 18"x18", SEE NOTE A)
BASE PLENUM TO BE SIZED ACCORDING TO HOT AIR DISCHARGE HOLE
ELECTRO–MATE HOLE OPENING
HI–LIMIT PROBE
MOUNT HIGH–LIMIT AS CLOSE AS POSSIBLE TO ELECTRO–MATE
12"
4"
DUCT SENSOR (ST) FOR WARMFLO ONLY (EM–WD*****)
FLOOR
SENSOR TUBE LOCATED BELOW ELEMENT IN HEATED AIR STREAM

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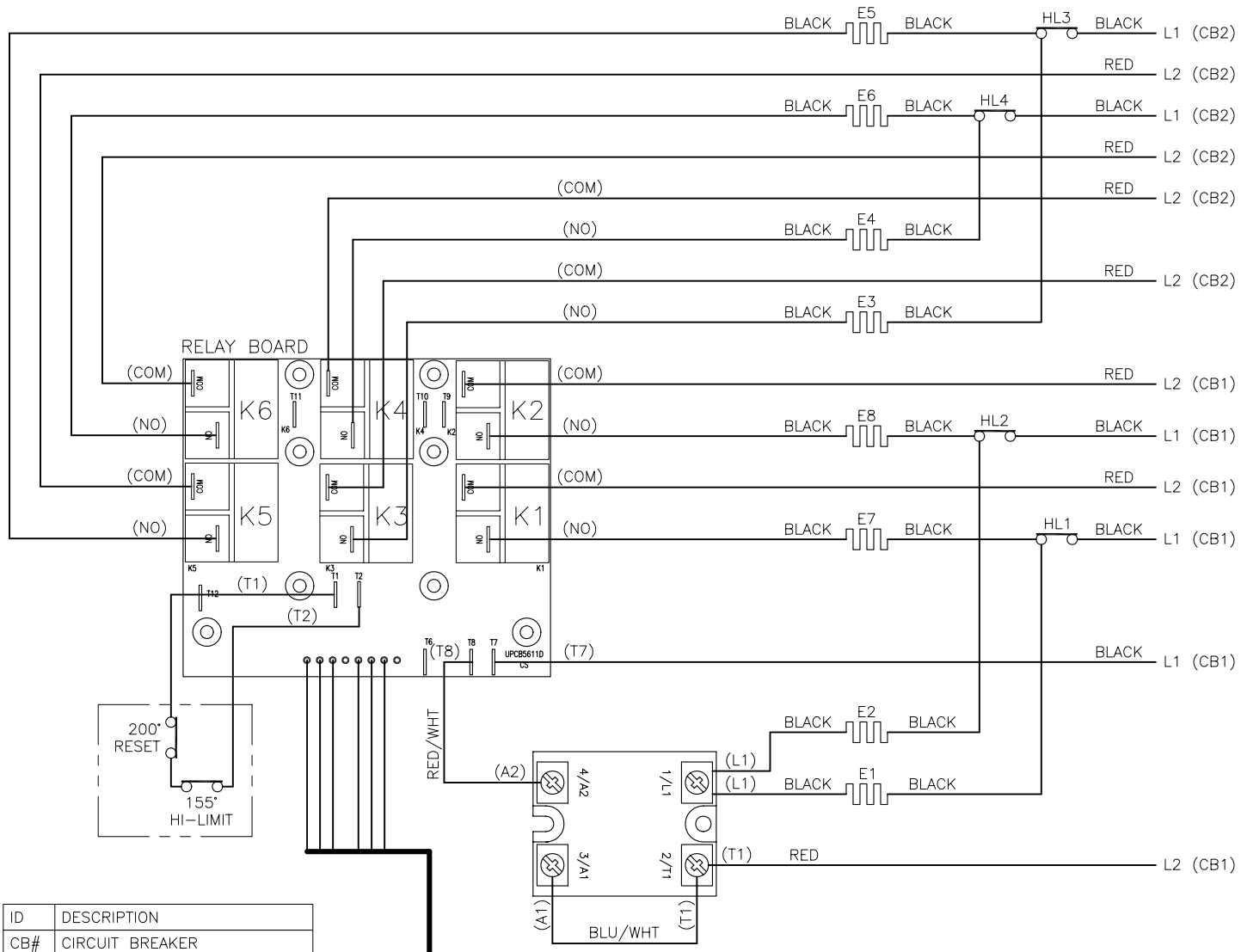


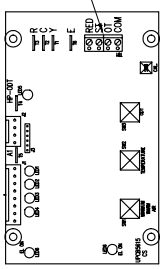
ID	DESCRIPTION
CB#	CIRCUIT BREAKER
HL#	HI-LIMIT
E#	ELEMENT
COM	COMMON
NO	NORMALLY OPEN
T##	TAB NUMBER (CIRCUIT BOARD)
K#	RELAY (CIRCUIT BOARD)

STAGES 1-4 ARE AT
24VAC WHEN INACTIVE.

TO J1

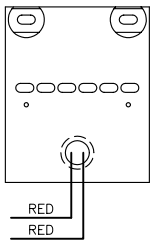
(STAGE 1, TRIAC)	ORANGE	1
(STAGE 2, K3-K4)	WHT/BLU	2
(STAGE 3, K5-K6)	ORG/BLK	3
(STAGE 4, K1-K2)	VIOLET	5
(COMMON)	GRAY	6
(24VAC, DURING T-STAT CALL)	RED/WHT	7

SENSOR CONNECTION
(CABLES NOT SHOWN)



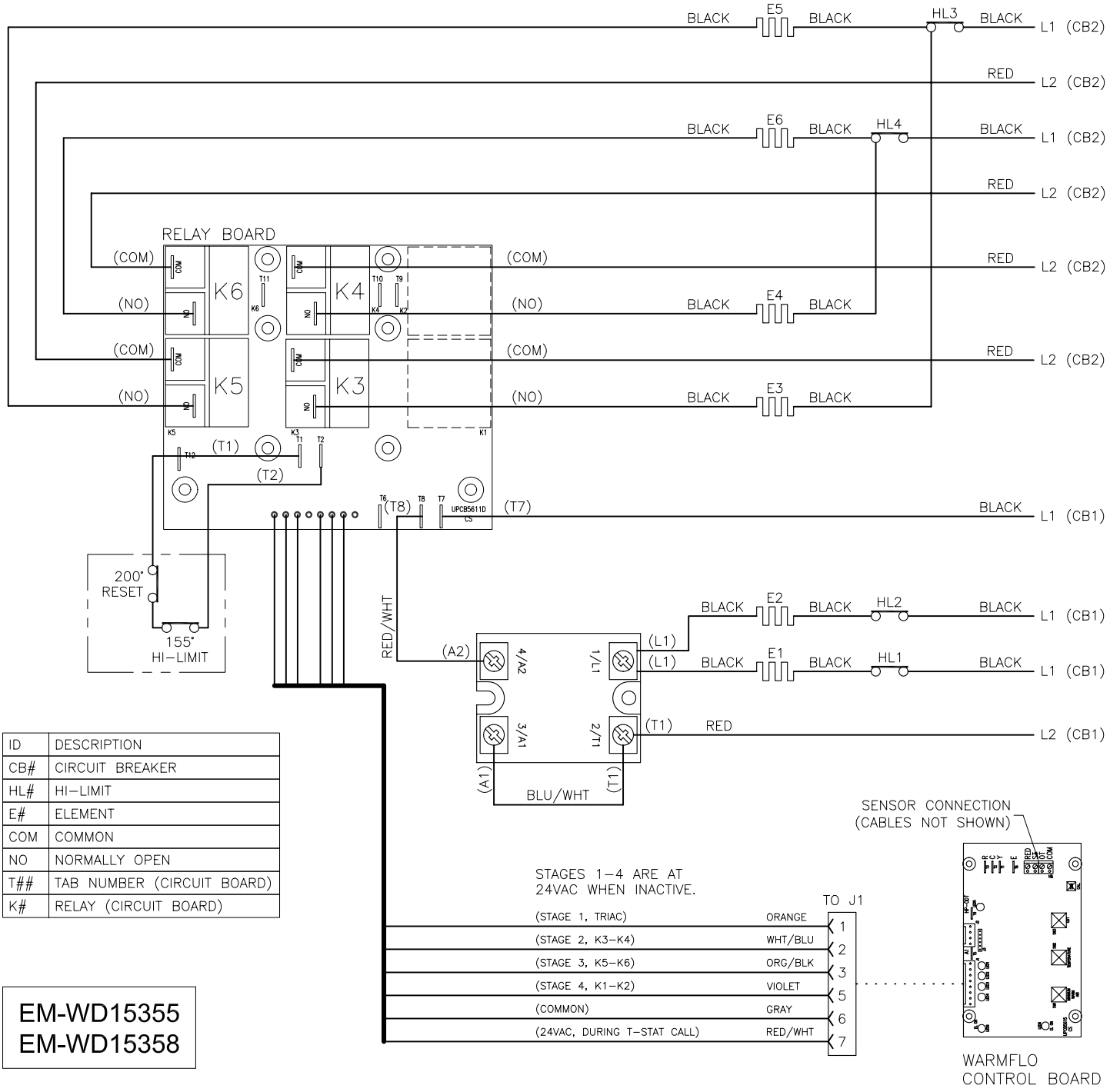
WARMFLO
CONTROL BOARD

EM-WD20455
EM-WD20458



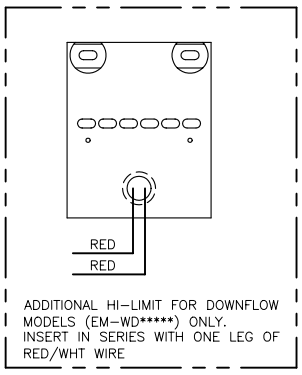
ADDITIONAL HI-LIMIT FOR DOWNFLOW MODELS (EM-WD*****) ONLY.
INSERT IN SERIES WITH ONE LEG OF RED/WHT WIRE

ELECTRO INDUSTRIES, INC. MONTICELLO, MN 55362			DESCRIPTION: EM-WD(102, 204, 153)5(5,8) WIRING SCHEMATIC	
DRAWN: MEF	REFERENCE DOCUMENT: ES716			
CHECKED	VIEW/DRAWING TYPE: WIRING SCHEMATIC		SCALE: NTS	PART/ASSY/MODEL NUMBER: EM-WD***5*
APPROVED	DRAWING STATUS: RELEASED	DOCUMENT DATE: 09-30-03	SHEET: 1/3	DOCUMENT NUMBER: ES723



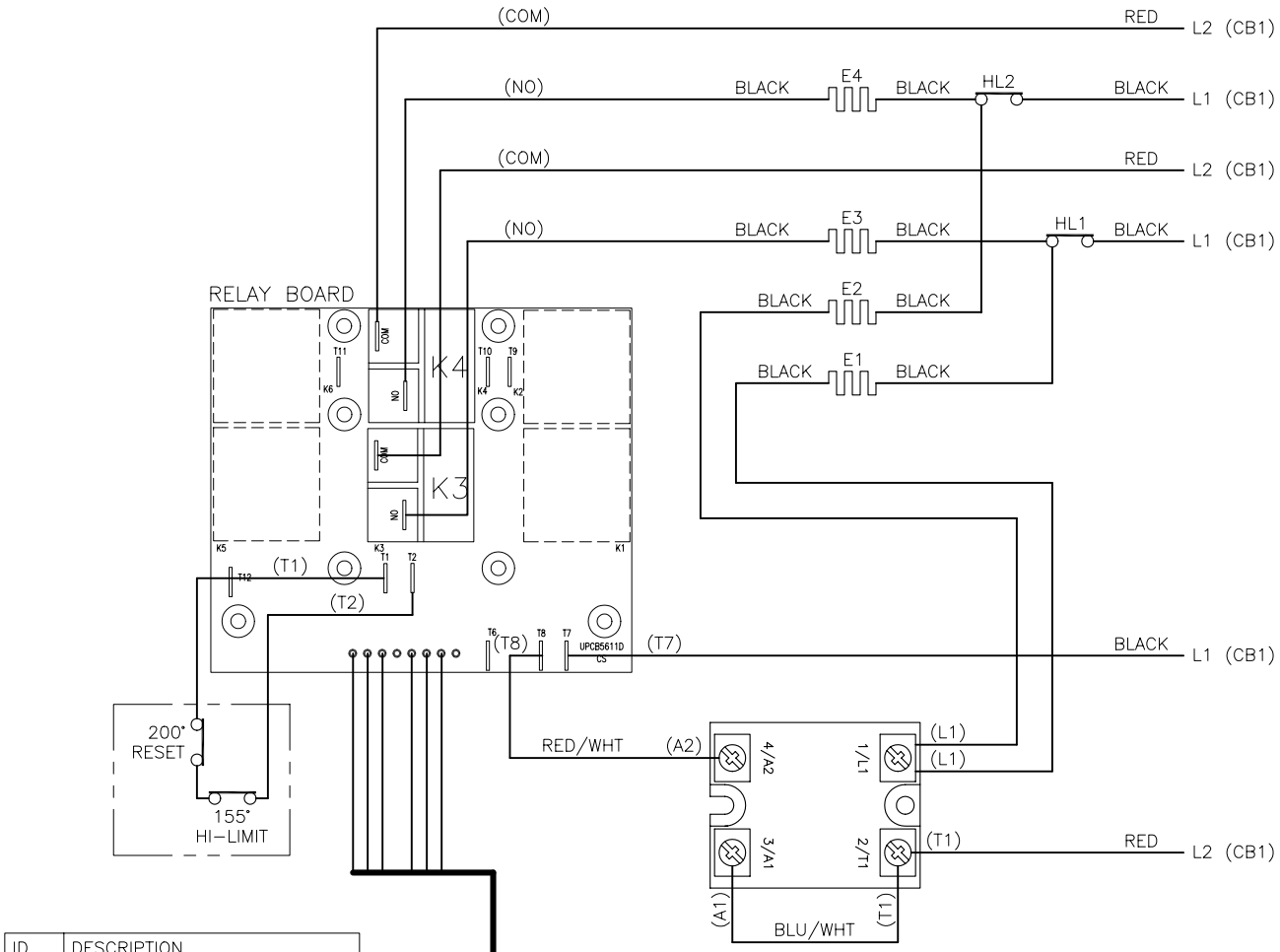
ID	DESCRIPTION
CB#	CIRCUIT BREAKER
HL#	HI-LIMIT
E#	ELEMENT
COM	COMMON
NO	NORMALLY OPEN
T##	TAB NUMBER (CIRCUIT BOARD)
K#	RELAY (CIRCUIT BOARD)

EM-WD15355
EM-WD15358

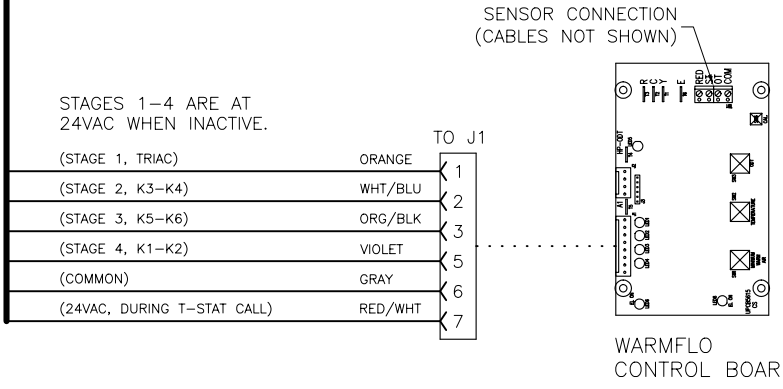


ADDITIONAL HI-LIMIT FOR DOWNFLOW MODELS (EM-WD*****) ONLY.
INSERT IN SERIES WITH ONE LEG OF RED/WHT WIRE

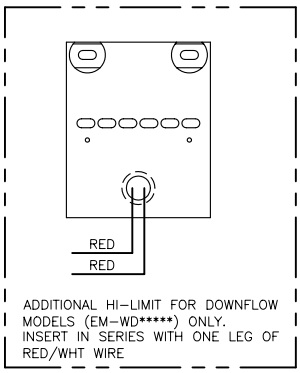
ELECTRO INDUSTRIES, INC. MONTICELLO, MN 55362			DESCRIPTION: EM-WD(102, 204, 153)5(5,8) WIRING SCHEMATIC	
DRAWN: MEF	REFERENCE DOCUMENT: ES716			
CHECKED	VIEW/DRAWING TYPE: WIRING SCHEMATIC		SCALE: NTS	PART/ASSY/MODEL NUMBER: EM-WD***5*
APPROVED	DRAWING STATUS: RELEASED	DOCUMENT DATE: 09-30-03	SHEET: 2/3	DOCUMENT NUMBER: ES723



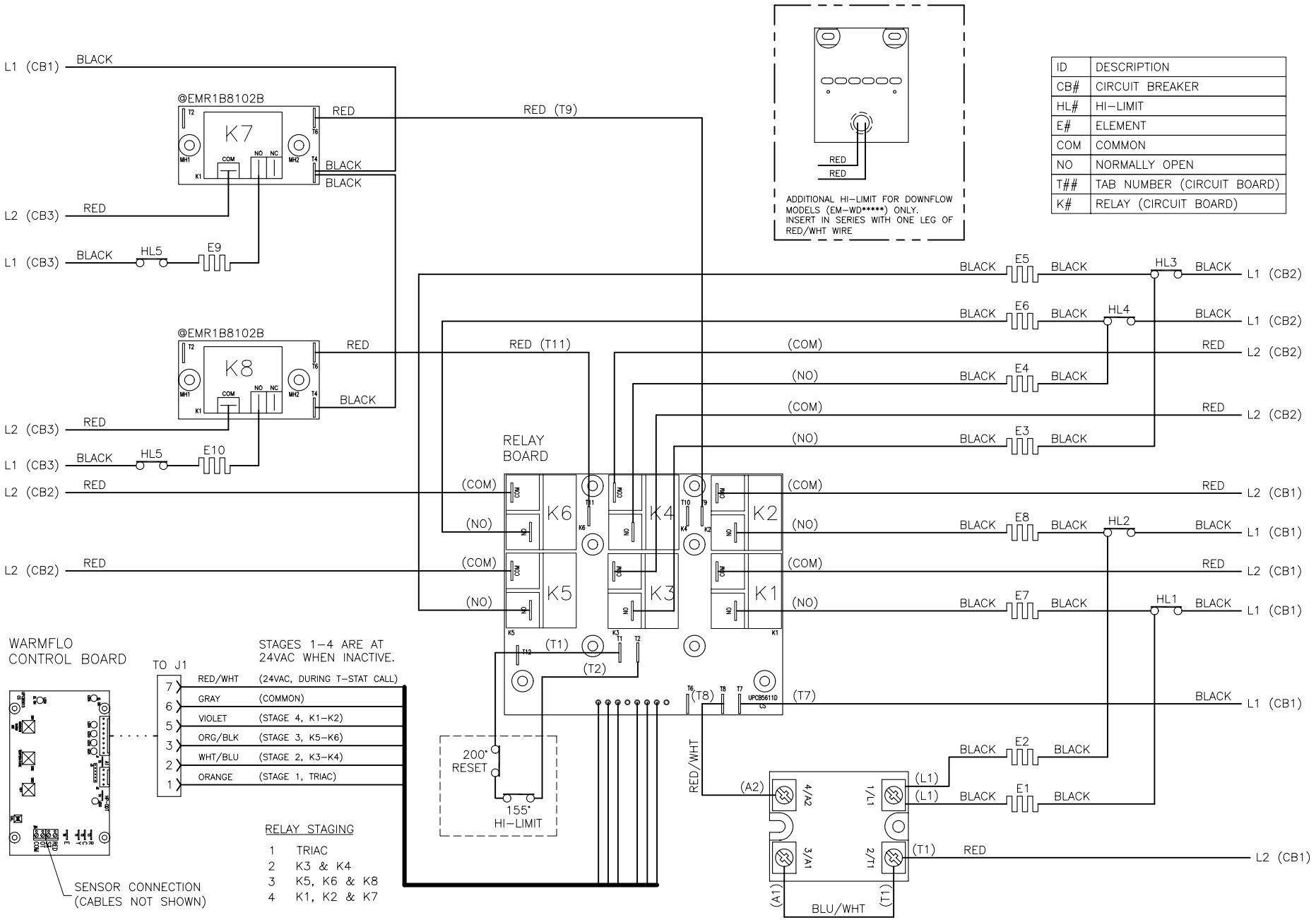
ID	DESCRIPTION
CB#	CIRCUIT BREAKER
HL#	HI-LIMIT
E#	ELEMENT
COM	COMMON
NO	NORMALLY OPEN
T##	TAB NUMBER (CIRCUIT BOARD)
K#	RELAY (CIRCUIT BOARD)



EM-WD10255
EM-WD10258



ELECTRO INDUSTRIES, INC. MONTICELLO, MN 55362			DESCRIPTION: EM-WD(102, 204, 153)5(5,8) WIRING SCHEMATIC	
DRAWN: MEF	REFERENCE DOCUMENT: ES716			
CHECKED	VIEW/DRAWING TYPE: WIRING SCHEMATIC		SCALE: NTS	PART/ASSY/MODEL NUMBER: EM-WD***5*
APPROVED	DRAWING STATUS: RELEASED	DOCUMENT DATE: 09-30-03	SHEET: 3/3	DOCUMENT NUMBER: ES723



ID	DESCRIPTION
CB#	CIRCUIT BREAKER
HL#	HI-LIMIT
E#	ELEMENT
COM	COMMON
NO	NORMALLY OPEN
T##	TAB NUMBER (CIRCUIT BOARD)
K#	RELAY (CIRCUIT BOARD)

EM-WD25458

ELECTRO INDUSTRIES, INC. MONTICELLO, MN 55362		DESCRIPTION: EM-WD25458 WIRING SCHEMATIC	
DRAWN: MEF	REFERENCE DOCUMENT: ES718		
CHECKED	VIEW/DRAWING TYPE: WIRING SCHEMATIC	SCALE: NTS	PART/ASSY/MODEL NUMBER: EM-WD25458
APPROVED	DRAWING STATUS: RELEASED	DOCUMENT DATE: 10-01-03	SHEET: 1/1
			DOCUMENT NUMBER: ES724

Electro Industries, Inc.

Limited Product Warranty

Effective February 5, 2009

Electro Industries, Inc. warrants to the original owner, at the original installation site, for a period of two (2) years from date of installation, that the product and product parts manufactured by Electro Industries are free from manufacturing defects in materials and workmanship, when used under normal conditions and when such product has not been modified or changed in any manner after leaving the plant of Electro Industries. If any product or product parts manufactured by Electro Industries are found to have manufacturing defects in materials or workmanship, such will be repaired or replaced by Electro Industries. Electro Industries shall have the opportunity to directly, or through its authorized representative, examine and inspect the alleged defective product or product parts. Electro Industries may request that the materials be returned to Electro Industries at the owner's expense for factory inspection. The determination as to whether product or product parts shall be repaired, or in the alternative replaced, shall be made by Electro Industries or its authorized representative. Electro Industries will cover reasonable labor costs to repair defective product or product parts for ninety (90) days after installation.

TWENTY YEAR (20) LIMITED WARRANTY ON BOILER ELEMENTS AND VESSELS

Electro Industries, Inc. warrants that the boiler elements and vessels of its products are free from defects in materials and workmanship through the twentieth year following date of installation. If any boiler elements or vessels are found to have a manufacturing defect in materials or workmanship, Electro Industries will replace them.

TWENTY YEAR (20) LIMITED WARRANTY ON SPIN FIN ELEMENTS

Electro Industries, Inc. warrants that the spin fin elements of its products are free from defects in materials and workmanship through the twentieth year following date of installation. If any spin fin elements are found to have a manufacturing defect in materials or workmanship, Electro Industries will replace them.

FIVE YEAR (5) LIMITED WARRANTY ON OPEN WIRE ELEMENTS

Electro Industries, Inc. warrants that the open wire elements of its products are free from defects in materials and workmanship through the fifth year following date of installation. If any open wire elements are found to have a manufacturing defect in materials or workmanship, Electro Industries will replace them.

ELECTRO INDUSTRIES, INC.
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763.295.4138 • 800.922.4138 • fax 763.295.4434
sales@electromn.com • www.electromn.com

THESE WARRANTIES DO NOT COVER:

1. Costs for labor for removal and reinstallation of an alleged defective product or product parts, transportation to Electro Industries, and any other materials necessary to perform the exchange, except as stated in this warranty. Replacement material will be invoiced to the distributor in the usual manner and will be subject to adjustment upon verification of defect.
2. Any product that has been damaged as a result of being improperly serviced or operated, including, but not limited to, the following: operated with insufficient water or airflow, allowed to freeze, subjected to flood conditions, subjected to improper voltages or power supplies, operated with airflow or water conditions and/or fuels or additives which cause unusual deposits or corrosion in or on the product, chemical or galvanic erosion, improper maintenance or subject to any other abuse or negligence.
3. Any product that has been damaged as a result of natural disasters, including, but not limited to, the following: lightning, fire, earthquake, hurricanes, tornadoes or floods.
4. Any product that has been damaged as a result of shipment or handling by the freight carrier. It is the receiver's responsibility to claim and process freight damage with the carrier.
5. Any product that has been defaced, abused, or suffered unusual wear and tear as determined by Electro Industries or its authorized representative.
6. Workmanship of any installer of the product. This warranty does not assume any liability of any nature for unsatisfactory performance caused by improper installation.
7. Transportation charges for any replacement part or component, service calls, normal maintenance; replacement of fuses, filters, refrigerant, etc.

CONDITIONS AND LIMITATIONS:

1. If at the time of a request for service the original owner cannot provide an original sales receipt or a warranty card registration then the warranty period for the product will have deemed to begin thirty (30) days after the date of manufacture and **NOT** the date of installation.
2. The product must have been sold and installed by a licensed electrical contractor, a licensed plumbing contractor, or a licensed heating contractor.
3. The application and installation of the product must be in compliance with Electro Industries' specifications as stated in the installation and instruction manual, and all state and federal codes and statutes. If not, the warranty will be null and void.
4. The purchaser shall have maintained the product in accordance with the manual that accompanies the unit. Annually, a qualified and licensed contractor must inspect the product to assure it is in proper working condition.
5. All related heating components must be maintained in good operating condition.
6. All lines must be checked to confirm that all condensation drains properly from the unit.
7. Replacement of a product or product part under this limited warranty does not extend the warranty term or period.
8. Replacement product parts are warranted to be free from defects in material and workmanship for ninety (90) days from the date of installation. All exclusions, conditions, and limitations expressed in this warranty apply.
9. Before warranty claims will be honored, Electro Industries shall have the opportunity to directly, or through its authorized representative, examine and inspect the alleged defective product or product parts. Remedies under this warranty are limited to repairing or replacing alleged defective product or product parts. The decision whether to repair or, in the alternative replace, products or product parts shall be made by Electro Industries or its authorized representative.

THESE WARRANTIES DO NOT EXTEND TO ANYONE EXCEPT THE ORIGINAL PURCHASER AT RETAIL AND ONLY WHEN THE PRODUCT IS IN THE ORIGINAL INSTALLATION SITE. THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE.

ALL IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED WITH RESPECT TO ALL PURCHASERS OR OWNERS. ELECTRO INDUSTRIES, INC. IS NOT BOUND BY PROMISES MADE BY OTHERS BEYOND THE TERMS OF THESE WARRANTIES. FAILURE TO RETURN THE WARRANTY CARD SHALL HAVE NO EFFECT ON THE DISCLAIMER OF THESE IMPLIED WARRANTIES.

ALL EXPRESS WARRANTIES SHALL BE LIMITED TO THE DURATION OF THIS EXPRESS LIMITED WARRANTIES SET FORTH HEREIN AND EXCLUDE ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES RESULTING FROM THE BREACH THEREOF. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY. PRODUCTS OR PARTS OF OTHER MANUFACTURERS ATTACHED ARE SPECIFICALLY EXCLUDED FROM THE WARRANTY.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY HAVE OTHER RIGHTS WHICH VARY UNDER THE LAWS OF EACH STATE. IF ANY PROVISION OF THIS WARRANTY IS PROHIBITED OR INVALID UNDER APPLICABLE STATE LAW, THAT PROVISION SHALL BE INEFFECTIVE TO THE EXTENT OF THE PROHIBITION OR INVALIDITY WITHOUT INVALIDATING THE REMAINDER OF THE AFFECTED PROVISION OR THE OTHER PROVISIONS OF THIS WARRANTY.